

*DONAUDAMPFSCHIFFFAHRTSGESELLSCHAFTSKAPITÄN*: THE EFFECTS OF  
INSTRUCTION ON THE L2 ACQUISITION OF GERMAN COMPOUND NOUNS

BY

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THESIS

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## **ABSTRACT**

In recent years, psycholinguists and neurolinguists have focused on the question of how exactly words are organized in the brain. According to Genesee (2000) and Park et al. (2012), L1 and L2 do not represent two different and independent language systems in the brain but are organized in a similar manner. Drawing upon this theory, one could conclude that L2 instruction should mirror native-like acquisition. This idea is highly supported by followers of the natural or communicative approaches. Accordingly, L2 learners would not need explicit instructions to acquire a new lexicon for already existing phenomena in their minds. However, the question of whether L2 acquisition follows this theoretical construct must be investigated.

This paper discusses L2 vocabulary learning processes. In particular, it focuses on the learning of German compound nouns, which can often be a source of confusion for learners. It investigates the following key questions: (1) Which strategy of vocabulary instruction (explicit or implicit) allows students to correctly use compound nouns in German? (2) How well do learners apply their knowledge of grammatical rules about the formation of compound nouns in novel contexts?

The paper reports on the results of a study of students enrolled in second- and third-semester German courses at a large research university. Two groups of participants were exposed to either explicit or implicit instruction in the formation of German compound nouns, and a third group received no instruction. A set of non-compound nouns was presented in instruction, and the participants wrote a vocabulary test two days after instruction. Participants who were in the explicit-instruction group more accurately used complex compound nouns within meaningful contexts. A post-instruction (“think-aloud”) discussion revealed that participants in the explicit group were better able to articulate and understand rules for the formation of German compound nouns, while students in the implicit group failed to recognize such rules.

This study has important implications for the acquisition of L2 vocabulary. The experiment shows that the acquisition of a lexicon is complex and requires varied types of instruction. In the case of German compound nouns, explicit instruction is shown to be more useful than implicit instruction or no instructional method.

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## CHAPTER 1: INTRODUCTION

“[...] when tweetle beetles battle with paddles in a puddle, they call it a *tweetle beetle puddle paddle battle*” Dr. Seuss.

Language acquisition has been a longstanding interest for scholars. On the one hand, it is considered to be a natural process which does not require special intervention. Every normal developing human starts pronouncing vowels and syllables, respectively, without formal instruction and any effort. On the other hand, this natural chain of development undergoes some changes and gets modified if we start learning second languages. The issue around necessity of foreign language instruction in the context of the modern academic system has already been discussed for a few decades. However, the topic has not become less complicated. Moreover, this discussion has acquired new facets and unexpected complications. Linguists, philologists, psycholinguists and neurolinguists are now involved in various projects connected with second language acquisition. This paper investigates the issue of vocabulary teaching which might become one of the main intrinsic constraints of second language acquisition.

Learning, memorizing and using new labels for already established items and notions in a native language means for many learners that they face an enormous problem and struggle. This psychological difficulty can directly affect the result of second language proficiency. In this thesis, I argue that new vocabulary learning in a second language is a complex cognitive process which requires a significant amount of skills, time, experience and practice from students as well as teachers. Furthermore, it can be positively or negatively influenced by the type of instruction, i.e., teaching method. In other words, finding an effective way to teach a large amount of vocabulary can improve classroom efficiency and results and ease the process of novel vocabulary acquisition.

In this paper I concentrate on German as a second language for American learners who already have built a basic knowledge in grammar, speaking and listening comprehension. After the first semester of formal instruction, they get to know some specific information about the lexical structure of German – compound nouns – which are a goal of my research. As a phenomenon, this should not create a major burden to learning but the fact that all multiple parts of compound nouns are merged in one single word can confuse students. Furthermore, grammatical characteristics, aspects of reading, pronunciation, and translation, might create great difficulty and be turned into a complicated labyrinth of vocabulary learning. To ease this situation, this thesis discusses the theoretical basis of this problem and reports on an experiment where students are exposed to explicit and implicit instructions. The aim of the study is to examine which of these approaches is more appropriate and effective in compound noun teaching.

## **CHAPTER 2: PREVIOUS STUDIES**

The active discussion around vocabulary in second language acquisition may be traced many centuries back. In most cases the answer to the question “Why do some learners struggle with mastering vocabulary, and for others it is just an elementary task?” can be boiled down to a vast philosophical conclusion about motivation and its absence, talent and “good” memory. Nowadays scholars can partially analyze this issue from a different angle. It goes deeper into the structure of the brain cortex. Studies in this field allow us to recognize that vocabulary learning is directly connected with the neural basis of created cortical networks. These studies show that different brain areas are responsible for different functions, usually more than one. For instance, while reading we recruit the visual area first – the occipital lobe, then temporal zones get engaged to recognize a word, and so on. Does it mean that a human is born with a ready-to-use set of functions and some of us are gifted with great memory and ability to learn many languages and others are not? Genesee (2000) claims that specialized brain areas are “not fixed at birth” (p.1). He compares the language brain zones with a computer. According to his theory, we all obtain an “incredibly sophisticated hardwiring, but not software” (p. 1). This means that all individuals possess a tool to learn different languages, and we need to develop this potential like we update and upgrade our software on computers. Consequently, we need to learn how to develop a top-level software. If we go further into the structure of units of information, we can see that learning is a sort of installing of connections. When learning occurs, “neuro-chemical communication between neurons is facilitated” (Genesee, 2000, p.1). Once we have learned something, we need less effort to refresh this information and activate the way to necessary neurons. In light of this theory, it can be assumed that new languages learning is not a gift but a

technique, a training which helps us to activate our brain. Consequently, these findings may have a practical application, and teaching methods should get special attention.

## **2.1 Brain and Second Language Learning**

To understand the complexity of this problem, we analyze how a second language is mediated in the neural system, how the mental “dictionary” is structured and how it functions. With help of this knowledge, we try to build an appropriate method of compound noun teaching in German as a second language.

The origin of scientific interest in second language acquisition and the brain goes back to the nineteenth century. At that time, the accounts of second language loss after brain damage had attracted attention of contemporary medical practitioners and scholars (Pitres, 1896, p. 876). Throughout the centuries methods of brain research have changed significantly.

In the twenty-first century, according to contemporary results in functional neuroimaging, scholars are inclined to think that the brain zones which are associated with speech production and processing are located in the left hemisphere. Martensson et al. (2012) argue that the neurophysiology of a native language is a chart-like system where the left inferior frontal gyrus (IFG), the left middle frontal gyrus (MFG), and the superior temporal gyrus (STG) play key roles. “Specifically, the left IFG and left MFG are the key regions in the articulatory network and the STG are involved in acoustic-phonetic processes such as spectrotemporal analysis” (Martenson, 2012, p.240). Badzakova-Trajkov, Häberling, Roberts, and Corballis (2010) state that around 97% of right-handed people and more than 70% of left-handed people have clear left hemisphere lateralization when using language functions. In contrast, Genesee (2000) says that despite the language lateralization in the left hemisphere, approximately 10% of right-handed individuals have a “different pattern of lateralization” which might include even two



hemispheres at the same moment. Moreover, gender aspects can also be considered as significant since male individuals are inclined to left-hemisphere engagement more than females. Additionally, it is important to mention individual differences between humans, which can provoke serious difficulties in language learning. This is not because of physical disability but because of an incorrect teaching approach, which is not directed towards the correct brain area. All mentioned theories show that despite significant progress, language lateralization still can be regarded as an opaque question.

Even more complex is the localization of a second language. The question of where exactly second language knowledge is stored in the brain and how it can influence teaching methods is still open to discussion. Some scientists argue that multiple non-native languages are represented in different brain areas or even in different hemispheres. Abutalebi and Rosa explain that this “picture was essentially based on the fact that it is not rare to observe a bilingual aphasic who recovers only with one language, while the other is lost” (Abutalebi and Rosa, 2013, p. 516). This example shows that a second language might be stored in a different place and, consequently, might be differently organized in comparison to L1. Similar results of the spatial differences between L1 and L2 have been shown in an experiment by Kim et al. (1997) where the neuroimaging method was used. This study was based on the silence-sentence-generation. Taken together, these results have indicated that the use of the native language and second language requires different areas of activation.

At the same time, cutting-edge functional magnetic resonance imaging (fMRI) research claims that the previous assumption about different brain areas in L1 and L2 can be regarded as fallacious. They argue that the neurodynamics of processing of already existing L1 and acquiring L2 significantly overlaps. According to this hypothesis, cortical representation of L1 and L2

demonstrates a striking similarity in the same neural areas, mostly Broca's and Wernicke's areas (Klein, Miller, Zatorre, Meyer & Evans, 1995).

However, in the course of research in neurolinguistics, the issue of L2 localization gave rise to a new hypothesis and a new level of complexity. The studies of the last decade have shown that age and proficiency level can have a large effect on the neural mechanism that allows L2 learning. According to this hypothesis, early bilinguals, late bilinguals and monolinguals who learn L2 after puberty demonstrate different manners of neural activity. Park, Badzakova-Trajkov, Waldie (2012) as well as Paradis (2000) draw parallels between these types of L2 acquisition and explain that early and skilled bilinguals use the same brain structures for L1 and L2. Late bilinguals who started acquiring L2 after adolescence can recruit "different language-processing areas of the brain than early bilinguals" (Buchweitz and Prat, 2013 p.423). The unskilled L2 learners older than 10-14 years old engage a significant amount of additional "helpers," brain areas used for acquiring new linguistic structures.

This leads us to the critical period hypothesis (CPH) and opens another question about whether L2 "obeys" maturational changes in the brain (McDonald, 2000). The CPH claims our brain development undergoes important changes after a certain age in our life which may affect L2 acquisition (Birdsong, 2006; Johnson & Newport, 1989). The rationale of the CPH rests on the contrast of native and second languages.

According to the critical period hypothesis, humans' cognitive abilities to acquire both native and second language depend on biological age. It would be logical to start this discussion with a vital example from the article by Snow and Hoefnagel-Höhle (1978). In this study Snow and Hoefnagel-Höhle (1978) prove that the critical period to form a "language-skeleton" must occur "before cerebral lateralization is complete, at about the age of puberty" (p. 1114). After

this period the abilities to become proficient in a native language declines. If a critical period for native language acquisition is right, this tendency might affect second language acquisition abilities as well. One of the supporters, Newport (1990), argues in her article “Maturation Constraints on Language Learning” that critical period can have the direct influence on L2 acquisition. In her experiment, she assessed the L2 competence of adults from different backgrounds. The participants were forty-six college students who varied in age and native language. All of the participants had been living in the US for at least ten years. They had to take a test which was focused on lexical and grammar areas. The results of the study showed that only participants who arrived in the USA at a young age achieved native-like language competence. The later the participants moved to the USA, the lower their score was. This data shows that even a full immersion approach does not guarantee absolute success in L2 competence.

The critical period hypothesis holds that first language acquisition must occur before cerebral lateralization is complete, at about the age of puberty. One prediction of this hypothesis is that second language acquisition will be relatively fast, successful, and qualitatively similar to the first language only if it occurs before the age of puberty. This prediction was tested by studying longitudinally the naturalistic acquisition of Dutch by English speakers of different ages (Snow & Hoefnagel-Hoihle, 1978). The subjects were tested three times during their first year in Holland, with an extensive test battery designed to assess several aspects of their second language ability. It was found that the subjects in the age group 12-15 and adults made the fastest progress during the first few months of learning Dutch and that at the end of the first year the 8-10- and 12-15-year-olds had achieved the best control of Dutch. The 3-5-year-olds scored lowest on all the tests employed. These data do not support the critical period hypothesis for language acquisition. Certainly, this study has some limitations, e.g., lack of strict participants’

classification for detailed analysis of their background, native language, English as second language competence prior to the immigration to the USA as well as amount of L2 exposure. Despite these features, this study allows us to assume that naturalistic approach effectiveness declines with the age of learners.

In order to acquire an L1, a child has to be exposed to this language in the early stage of development, but without explicit instruction. Without a natural linguistic environment and after a certain life span, a child gradually loses the skill. Conversely, L2 acquisition is based on alternative principles. In the review-paper, Abutalebi and Rosa explain this notion based on the declarative/procedural model published by Ullman (2001). This model “provides a rationale for the supposition of differential representation by claiming that in normal monolinguals, words are represented in a declarative (i.e., explicit) memory system whereas grammatical rules are represented in a cognitive system that mediates the use of procedures (i.e., implicit memory that is processed without conscious awareness)” (Abutalebi & Rosa, 2013, p. 577). According to this theory, after a critical period, individuals cannot acquire language with the help of implicit or unconscious learning. Furthermore, Ullman (2001) supports this theory with the data which shows that explicit and implicit knowledge engage separate brain areas: Broca’s area and basal ganglia – for explicit knowledge; left temporal areas – for implicit. Consequently, L1 speakers and L2 speakers may demonstrate varying neural networks, depending on the age of acquisition.

Apart from the aging effect, the proficiency level may also have an impact on language lateralization. Green (2003) argues that L1 and L2 brain activities can develop separately only during the beginning stages. In this case, beginners try to involve additional brain areas to support a new linguistic system. Similar results were demonstrated by Hernandez, Hofmann and Kotz (2007). In their experiment, they focused on the irregular and regular morphology as well

as syntactic processing. The participants of the study were late and early bilinguals. The results showed that the late bilingual participants demonstrated a higher activity in the prefrontal cortex than the early bilinguals.

Furthermore, an experiment by Abutalebi et al. (2001) reviewed both aging effect and proficiency by analyzing 11 neuroimaging cases among early and late bilinguals. The results of the study provided evidence to confirm the assumption that early bilinguals engage the same cortical brain areas for L1 and L2. Interestingly, the late bilinguals showed a clear opposition between advanced speakers and beginners without a strong relationship to their age. Abutalebi et al. claim that age effect does not seem to be a key factor for second language learning; the proficiency might be linked directly to additional brain activation for beginners mostly because of “a lack of cognitive control and the need for greater cognitive effort in those who are not fluent in L2” (Park, 2012, p. 689). This leads to the preliminary conclusion that the late bilinguals engaged in additional processing in order to confront naturally occurring constraints. Moreover, while learners achieve an advanced level of L2 proficiency, the differences in the brain vanish, and the brain moves/adapts the L2 to a similar level as the L1. This shows that proficiency is one of the key factors in the second language localization. Thus, low proficiency requires additional brain activation; it should be mirrored in the teaching approach for the new acquisition of vocabulary and rules.

## **2.2 Vocabulary Learning**

In comparison to brain lateralization, where scholars can measure neuron activity, a consensus in the discussion about acquiring new vocabulary is hard to find. The first and probably main constraint in this case is that it is impossible to observe. The data in this situation is retrieved from experiments which form current assumptions. As we know, native words are

learned at a rapid pace and without formal instruction. If a baby hears a word or a phrase in a certain context again and again, he or she labels this event and is able to repeat it the next time. This assumes the first stimuli need to be visible, audible, and frequent.

Although many people do not perceive it as a demanding process, this phenomenon is highly complex. Gleitman and Wanner (1982) explain that word learning is not only an intuitive process. They say that if a mother repeats the word “cat” and points at the cat lying on the rug, this does not mean that a child will save the new word and the correct object correspondence in the mental dictionary. A child observes more than one object at a time. In this case, this will be a cat sitting on a rug and floor where the rug lies, a book that is close to the rug, and so on. By accident, children might associate the phonetic information (“cat”) with a name of a certain animal “Cat” or might overgeneralize and label all animals. This example shows that to learn a word, children need to understand what object is referred to in a particular situation. Another complex question is how children will distinguish different objects that share similar main concepts and characteristics. In other words, how can children generalize poodles, beagles, and German sheep dogs into a “dog” category and distinguish from them monkeys, even though a monkey also has a head and four extremities and is hairy? Mysteriously, after the first hundred acquired words, any errors referring to the wrong object become minimal. Moreover, the more words a human encounters, the more he or she remembers them (Gleitman & Wanner, 1982).

Often this lexical database is called a mental “dictionary” from which we retrieve lexical units. If this is so, this dictionary for adult speakers should include at least highly developed spelling recognition features, definitions, and the phonetic image of a word. These characteristics permit us convenient usage at a fast pace: “word recognition takes less than one-third of a second” (Libben, 2012, p. 399). Many psycholinguists support an idea that words are stored in a

“ready-to-use” form including prefixes and suffixes. While speaking, we just take them out of our mental dictionary and put them into an utterance. While reading, we look at the item, process its phonological characteristics (analyze its pronunciation), retrieve its meaning as a whole, and put it into a sentence.

Others argue that if our dictionary were so fixed, it would include more than 200,000 items which would prohibit the fast usage of our mental dictionary. Some linguists claim that multimorphemic words are stored according to their morphemes and roots. All these parts might be connected within different groups, which allow us to use them easily. Libben (2012) suggests two major ways to explain the activation of morphemes. First, he mentions the post-lexical decomposition. According to this theory, multimorphemic words (e.g. reaction, happiness, preoccupied, etc.) are stored in the mind as independent morphemes (e.g. re-action, happy-ness, pre-occupy-ed). When a person hears a complex multimorphemic word, he or she processes it first as a whole unit, and then deconstructs it to single morphemes. Another view of this issue is pre-lexical decomposition. This approach explains that “the activation of constituent morphemes results from a computational mechanism that scans a word and isolates individual morphemes in much the same way as individual words are isolated when we see and hear sentences” (Libben, 2012, p. 411).

Individually, each word corresponds to a specific entry. Setola and Reilly (2005) state that each of these entries has information about a word’s meaning, its grammatical characteristics (e.g. part of speech) and relationships with other words around it. Most researchers still assume that words are disembodied symbols which are organized as a complex network. This network might be built hierarchically (e.g. animal – mammal – dog – beagle) or through associative links (orange – juicy – eat). These connections can demonstrate different levels of strength of

associations based on familiarity, frequency of usage, and many others. Furthermore, all the complex networks build semantic memory, which may be represented by nodes, “where activation spreads automatically from one node to the nearby ones along associative pathways” (Setola and Reilly, 251, 2005). Facilitation of connected words or frequent words can change the relative special proximity of nodes and modify the structure of the network. It will change expectancy level or priming. This phenomenon means previous exposure “to information (prime), which can be orthographically, phonologically, or semantically related to the target” (Setola and Reilly, 2005). This time of exposure will directly influence the velocity and level of accuracy of word recognition. Biologically, this phenomenon may be explained through cell assembly theory, presented by Hebb in 1949. According to this approach, cell assemblies comprise networks of neurons, which are connected to other networks of neurons. These “contagious” effects of activation lead to activation of the whole cell assembly. Following this theory, it is important to notice that the strength of connection can be improved by the frequency of firing of neurons. Consequently, repeated actions can lead to the increased speed of word access and formation of stronger networks. If so, words are usually used in meaningful context as a constructive part of a bigger structure, referred to as a syntactic unit. The next question would be how to construct sentences based on the acquired words.

### **2.3 Syntax Learning**

Recent research has shown that even in early stages children are aware of some syntactic rules. Despite the complexity of this task, 17-month-old children can distinguish subject and object and retrieve the meaning of the whole sentence. At the age of two, children start to apply the acquired syntactic rules and produce sentences, which despite their simplicity, demonstrate a rich variety of structures. They include such constructions as a noun + verb, noun + noun,



adjective + noun, and many others. Admittedly, young children often omit or are inconsistent in usage of closed class words such as articles, auxiliary verbs, and verbal inflexions, which makes their speech telegraphic-like. It takes them many months to become consistent and sensitive to usage of grammatical morphemes and auxiliary verbs. Fromkin et al. (2003) show a chart with the process of syntactical development:

25 [dant it tsip] “don’t eat (the) chip”

[bat tat] “block (is on) top”

26 [mamis tu hes] “Mommy’s two hands”

[dedi go] “where Daddy go?”

27 [do bajt mi] “don’t bite me”

[kʌdər sʌni ber] “Sonny color (ed a) bear”

28 [mamis tak mens] “Mommy talk(ed to the) men” (p. 363)

From this chart, it can be clearly understood that it takes time before children become consistent and use functional units more than 90 percent of the time. Nevertheless, this does not mean that children are not aware of syntax. In most cases, children are very sensitive to word order and almost never make such an error, so their speech is never chaotic. Around ages 2.6 to 3.6, children tend to acquire language at an especially fast rate. During this period of time, it is hard to identify certain phases and segregate them. As Fromkin et al. (2003) point out, at “the age of 3;0 most children are consistent in their use of function morphemes. Moreover, they have begun to produce and understand complex structures including coordinated and embedded sentences of various kinds: ‘He was stuck and I got him out’; ‘I want this doll because she’s big’ [...]” (p. 367). This demonstrates that humans acquire a unique ability not only to produce and perceive

single words but also play with the same words in order to form different connotations and retrieve information from unlimited variations of sentences.

Although researchers have previously tried to localize syntax in the brain, nowadays no consensus has been reached. Even a precise look at this problem with the help of fMRI and EER did not provide a basis for an unambiguous argument. However, most of the research recognized left-perisylvian language regions, interfrontal and superiortemporal areas of Broca's and Wernike's areas. These findings were presented more than two decades ago by Carramaza and Zufir (1976) when Broca's aphasics struggled with understanding and interpreting passive syntactic structures. They failed to recognize the subject and object of the situation. At first glance, a simple sentence "the apple was eaten by a girl" confused the patients. Since then, Broca's area (opercular and triangular portion of IFG) is considered to be in charge of syntax. Nevertheless, according to Fedorenko et al. (2013), today's studies acknowledge that these regions also involve lexico-semantic and phonological processing. Some other studies identified additional brain areas such as STG, insula and subcortical structures to be responsible for syntax as well. This leads to the idea that implicated brain regions do not demonstrate a clear map; they are complexly entangled and share their functions by forming a broad network. This network engages different brain areas depending on certain tasks, even nonlinguistic ones.

## **2.4 Compound Nouns**

Following the discussion about single words and syntactic structures, it is worthwhile to take a look at the compound noun as a complex structure. It can be assumed that compound nouns can be defined as a combination of more than one lemma. This structure is governed by rules of morphology, which are more complex than single word structures but less complex than syntax. If this is the case, it might be claimed that compound nouns are an intermediate phase between

simple nouns and syntactic structure. The kinds and number of English compound nouns are nearly limitless. Fromkin, et al. (2003) demonstrate this phenomenon in the following chart:

	Adjective	Noun	Verb
Adjective	Bittersweet	Poorhouse	Whitewash
Noun	Headstrong	Homework	Spoonfeed
Verb	-	Pickpocket	Sleepwalk

(Fromkin, et al., 2003, p. 93)

It is evident that the compound nouns can be formed from different class units or the same part of speech. This suggests that the processing of compound nouns is a demanding task for the brain. On the biological level, the processing of compound nouns activate the angular gyrus, the adjacent supramarginal gyrus, and the middle temporal gyrus in the left hemisphere. Moreover, they also engage some regions of the right hemisphere. This shows the complexity of compound nouns which justifies the great amount of different engaged brain areas.

Further, compounds are processed more slowly than if they were “separated by a space, suggesting that they are represented as lexical units, at least at certain extent” (Forgacs et al., 2012, p. 1434). The result of eye-tracking experiments in such languages as English and German shows that two ways of processing might exist. The first of them is decomposition, or storage of every lemma separately, and the second is reintegration, which “seems to be a semantic composition, determined by the relational structure of the constituents” (Forgacs, 2012, p. 1434). An example of this tendency is a compound “cheese-shredder” which shows a “for” relationship, or “jeans pocket” – “in” relationship – “jeans in the pocket”. This concept is the same for novel and frequent compound nouns. This was shown in the study by Raffray (2007), where participants were exposed to pictures and had to name them.

Another relevant question is how to treat a compound noun and how compound nouns are stored in our brains. Some researchers claim that this functions according to the theory of the structured storage of compounds. To this research question there are two main streams of argument. First is that compound words are represented as unitary lexical units which are learned and stored in fixed shapes. This opinion is based on the assumption that some compound nouns are non-decompositionable, which depends on many factors such as frequency of compound nouns and their usage.

Other arguments show that compounds are “individual constituents that are processed combinatorially” and analyzed via a special mechanism (MacGregor and Shtyrov, 2013, p. 217). In other words, they are stored separately and reassembled. Finally, these two points of view can be combined and used depending on certain cases and kinds of compound nouns. MacGregor and Shtyrov (2013) call this approach a “dual-route model.” They assume that one of the aspects that may affect this cognitive process is semantic transparency, which means “clarity of relationships between the meanings of the compound words” (p.217). As an example, they demonstrate the compound noun “homework” where the meaning is easily retrieved by processing the individual components “home” and “work.” These transparent relationships do not require a “distinct lexical representation but may be processed via a mechanism akin to syntactic rules linking in sentences” (p. 217). In other cases, compound nouns need to be saved in the mental dictionary as a whole-form lexical unit. “Framework” or “skyscrapers” are examples of this case. It is also worth mentioning that the frequency of compound nouns plays an important role. If a word is frequent enough, it needs to be stored in a ready-to-use form. Less frequent words can be stored as individual parts, which can be activated and pulled together in a necessary situation.

The processing of opaque and transparent compound nouns has been widely discussed from a psycholinguistic perspective. In some studies, researchers used a semantic priming paradigm. The results have shown that time for lexical decisions in transparent compound nouns increased using a prime related to one of the compound units. In opaque compounds this tendency was not present. As a result of these studies, it was claimed that “individual constituent semantics were accessed only for transparent compounds,” which can lead to combinatorial processing for transparent compounds and direct access of opaque compound nouns as whole units (MacGregor and Shtyrov, 2013, p. 218). Interestingly, another experiment which used cross-modal semantic priming demonstrated that the first unit of German compound nouns in spoken speech primed only in the case when the main unit was transparent. The opaque main unit did not present any priming effects on the first unit (Isel et al., 2003). Furthermore, Libben et al. (2003) researched morphological decomposition with the help of behavioral techniques. They used a lexical decision task where participants were exposed to a repetition priming paradigm. The results showed that participants’ decision-making was increased after the presentation of one of the compound units. Similar results were indicated in both opaque and transparent compounds (Zwitzerlood, 1994). As can be seen from this short review, the research on compound nouns is highly inconsistent and controversial.

To shed light on this issue, neurological research has examined the physiological complexity of compound noun processing. The studies that used event-related potentials (ERPs) demonstrated a mixed activation of constituent semantics and fMRI and hemispheric lateralization. MacGregor and Shtyrov (2013) presented a compound noun processing study which was concentrated on spoken words and a passive-listening oddball paradigm. They adopted previously investigated psycholinguistic studies, systematized them, and created a

complex study design. These allowed them to successfully measure brain activity and investigate the earliest automatic stages of compound word processing. The research was focused on the question of whether compound words are processed according to combinatorial or whole-form routes. They also took into consideration the transparency or opaqueness of lexical units as well as frequency. The participants in the study were native British English speakers who were exposed to transparent, opaque, and pseudo-compounds. All the words ended in “work” (“homework”, “schoolwork” as transparent, “groundwork”; “clockwork” “patchwork” as opaque; “houndwork” as a pseudo-word). The subjects listened to audio-recordings in infrequent order while EEG was recording brain activity. The result of the experiment showed a Mismatch Negativity (MMN) response in all conditions. Nevertheless, the different groups of compound nouns elicited different MMN results. This can be explained, first of all, by sensitivity of word frequency. For instance, the opaque compound demonstrated larger MMN for high frequency than low frequency compound nouns. However, the transparent compound of low and high frequency showed similar MMN. The pseudo-compounds demonstrated  $-0.790 \mu\text{V}$  (MMN). The researchers claim that the results explain that early access to lexical units are located on automatic level of the experiment show that meaning might be stored as a unitary concept although it can be accessed “from unitary representation than computed via a combinational mechanism” (MacGregor and Shtyrov, 2013, p. 226).

Besides the transparency or opaqueness of meaning of compound nouns, it is reasonable to take a look at their structure. In this situation, it is important to mention that the rightmost word will be considered “main” and project classifying content. The second part will determine its characteristics and narrow the classification. If two words are from different grammatical classes, the last one will determine the grammatical category of the whole word. “On the other

hand, compounds formed with a preposition are in the category of the nonprepositional part of the compound; *overtake*, *hanger-on*, *undertake*, *sundown*, *afterbirth*, and *downfall*, *uplift*” (Fromkin et al., 2003, p. 93).

The most frequent compound nouns in English are two-word compounds. They can be spelled with spaces, dashes or fused together. Spelling is highly individual and needs to be memorized (e.g. blackboard, green card, gold-tail). Interestingly, compound nouns as a linguistic phenomenon do not exist only in English. They are also spread in French “*cure-dent*” (“toothpick”), Russian “*cetyrechugolnik*” (“quadrilateral”), Spanish “*tocadiscos*” (“record player”), and German “*Käsebrod*” (“bred with cheese”), Hebrew “*bet sefer*” (“school”), Finish “*hätäuloskäytävä*” “emergency exit”. Moreover, Fromkin et al. (2003) notice that also the Native American language Papago has compound nouns such as “*doakam*” (“living creatures”) and “*hatichu*” (“thing”); together they form a compound “*doakam hatichu*” - “animal life” (p. 95).

### CHAPTER 3: COMPOUND NOUNS IN GERMAN

German compound nouns attracted the attention of teaching experts some decades ago. Who would not be daunted when he or she faces such words as “*Telekommunikationsüberwachungsverordnung*”, “*Unternehmenssteuerfortentwicklungsgesetz*”, or “*Verkehrsinfrastrukturfinanzierungsgesellschaft?*” It can be especially dramatic for someone who just started learning German. How does one learn similar words, and how does one translate and use them? First of all, we should take a look at the structure and formation of compound nouns. This understanding of noun formation should ease the learning process for students at the beginning stages.

The compound nouns are constructed from at least two word roots or morphemes. The parts of a compound unit are rarely semantically identical even if they belong to the same part of speech. In German, a compound noun can be described as a system of a describing part (*das Bestimmungswort*) and main described word (*das Grundwort/das Basislexem*). This means that the first morphemes describe the subsequent ones. Furthermore, almost all parts of speech are able to form compound units:

Verb + Adjektiv (e.g. röstfrisch, tropfnass)

Adjektiv + Adjektiv (e.g. schwerkrank, lauwarm)

Noun + Adjektiv (e.g. hilfsbereit, hitzebeständig)

Verb + Noun (e.g. Lautstall, Schlafraum) (Duden, 1998, p. 424)

On the one hand, some German compound nouns can be easily translated into relatively similar languages such as English or French. For instance:

Das Kleinkind (le petit enfant, French)

Der Staatsfeiertag (national holiday, English)



Der Meinungsaustausch (exchange of views, English)

Graefen and Liedke also mention that there are certain exceptional compound nouns which are easy to recognize. In this case, these are units with a dash which divide a noun into two or three independent parts. Such nouns are called *die Bindestrichkomposita*, a dash compound noun (e.g. Goethe-Institut, Duden-Grammatik). The same principle is used for the formation of compound nouns with proper names, numbers and words in foreign languages. For learners of German, they do not usually introduce any burden (Graefen & Liedke, 2012).

On the other hand, some details and characteristics of German compound nouns are hard to translate and to use in many other languages. Such burdens include spelling, word stress: main stress or secondary stress (der Hauptakzent, der Nebenakzent), and connecting units (die Fugenelementen) (Graefen and Liedke, 2012, p. 99).

The Duden grammar handbook explains that in the compound formed by two units, only the first unit will be stressed (Fensterrahmen, Arbeitshose, Ersatzteile). With the compound nouns whose structure is constructed from more than two parts, the stress rules are more complex. First, if compound nouns follow a structure (a + (b+c)), the stress is on the second noun root, i.e. unit b (e.g. Welthungerhilfe, Bundesaußerministerin). Second, a compound noun has a (a + (b+c)) but the (b+c) became a permanent phrase. In this case, the first part will be stressed (e.g. Studentengewerkschaft, Hauptbahnhof, Seniorenparkplatz). Third, in compound nouns formed according to a structure ((a+b)+c), the first unit will be stressed (Bahnhofszentrum, Nebenstellenvertreter). Moreover, in some cases, many different versions of stress analyses are possible. Consequently, different stress versions (e.g. Einfamilienhaus - Einfamilienhaus) can be regarded as appropriate.

In such situation when compound nouns consist of more than three components the previously discussed rules need to be used. The Duden handbook demonstrates this phenomenon with the example “*Bahnhofsgaststätte*”. This compound noun is formed by two main units “*der Bahnhof*” and “*die Gaststätte*”. The main unit is the last one “*die Gaststätte*” which also lexicalized. According to the second rule, the stress will be on the first part of the first unit. At the same time, first compound unit is lexicalized in the compound noun “*Eisenbahnbetriebsgesellschaft*”. According to the first rule, the stressed part is the second compound unit.

Furthermore, the uniqueness of German compound nouns is that you can play with them, as with a puzzle, building different compounds from the same set of words. Every time you can get a different term emphasize, different connotations and details. Confusion for students can also indicate the fact that the parts of a compound noun, even if they belong to the same category of speech, do not play the same role. The place of a unit will provide essential information whether this is a determining part or the main component. An evident example of this point is a pair *Radiowecker* (“radio alarm”) and *Weckerradio* (“radio which has different functions and among main is alarm function”). As we can see, despite the semantic similarity of components, the meaning of a compound noun as a whole unit will be changed significantly.

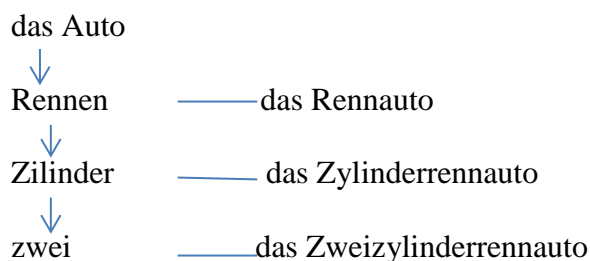
Semantically, there are three main groups of compound nouns. The first one consists of transparent compounds whose units form a clear and straightforward meaning. An instance of this phenomenon is *die Handpflege* (hand care) where *die Pflege* (care) is a main noun and *die Hand* (hand) is a determining noun. Knowing two separate words allows recipients of information to understand the compound noun. The second type of compounds is opaque which content is not easily accessed from the meaning of each component. For example, *das*

*Versuchskaninchen* which literally can be divided into “der Versuch” and “das Kaninchen”. The content itself is far from both nouns. It means “guinea pig.” It is also worth mentioning that the level of opacity and level of transparency are relevant in German and in some cases the border between the two groups is not strictly clear. This phenomenon can be demonstrated on the example of *das Trinkgeld* where it is hard to perceive without knowing a context or meaning of the word itself what kind of “money” it is and in which situation we can use it.

The relationships between the compound units are even more complex. They can be explained with help of prepositional structures such as FOR-compounds, IN-compounds, ON-compounds, FROM-compounds and others. Examples for the FOR-type are *das Lehrerhandbuch* – a teaching book for teachers; *das Kindermenü* – a menu for children. The examples FROM/OF-type are *der Gemüsesalat* – a salad made of vegetables, *die Sandburg* – a castle made of sand. Although these tendencies seem to be transparent, they might cause a difficulty of understanding when a describing noun can be in some cases used both in FROM/OF or as FOR-combinations (*die Kinderwurst* – “children” and “sausage”). The combination of *die Pilzwurst* and *die Kinderwurst*. Reading both words in one text could confuse a beginning level student and cause an anecdotal situation.

To identify the gender plural/singular form of a compound noun it is necessary to find the main noun which stands at the end. Its characteristics will reflect the characteristics of the whole compound noun. As for example, the noun “Abendessen” consists of two nouns “das Essen” and “der Abend”. In this situation the main noun is “das Essen”, consequently, the whole compound will get the characteristics of the main noun “das Abendessen” (neutral gender, singular). This leads us to the argument that learners of German have to be aware how to identify describing and main units in a compound noun to use them successfully.

Admittedly, compound nouns play an important role in formation of technical terms. Ickler (1997) claims that compound nouns are a great source of technical language. He illustrates this argument with help of an example *weißer Fisch* (a white fish) and *der Weißfisch* (white fish as a specie). He argues that compound noun formation radically changes the register of a noun. It gets a narrow, professional connotation. At the same time, such a system may help to understand a term through understanding its compound units. The Duden handbook calls this approach “transparent and understandable” (Duden, 1998, p. 425):



As it can be seen from this example, a complex technical term is easily “unpacks” into four simple parts which allows a reader to understand its meaning without a special knowledge in this field.

Another complication for SLA learners of German can be the so called “Fugen” which means when two or more words are fused together, as for instance, in the words “*Hochleistungsflüssigkeitschromatographie*” or “*Haft-pflicht-ver-siche-rung*.” In such cases between the words, connecting elements (die Fugeelemente) of different kinds appear. Semantically these connecting parts are empty which means that independently they do not carry any meaning. The function of the connecting elements is strictly morphological. In German, the choice of connecting units is large, e.g. -(e)n-, -(e)s-, -er-, -e- or (-).

The appearance of the connecting units can be explained by the fact that some of the compound parts were built from the former Genitive case forms or plural forms, as for instance:

- 1) die Zeit des Lebens, die Lebenszeit
- 2) die Leber von Hühnern, die Hühnerleber

Nevertheless, some connectors did not move from the former forms as indicators of case or number, they appeared only in the compound words. Graefen and Liedke (2012) demonstrate this phenomenon on the example of feminine nouns. In the genitive case, feminine nouns do not obtain any “s” suffix, but it appears in compound words (“Arbeit-s-tag”, “Geburt-s-tag”, “Funktion-s-verlust”). These examples lead to the idea that in the compound nouns, the connecting particles function only as connectors, they do not show any straightforward influence on the content of compound words.

## CHAPTER 4: EXPLICIT AND IMPLICIT TEACHING METHODS

The pedagogical methods have changed from translational teaching to naturalistic during the last centuries, but the question about the most effective way to learn languages is still open and keeps attracting the minds of psychologists, psycholinguists, education specialists, and foreign language learners and teachers. The root of the problem lies even in the term which we use, e.g., “Second Language Acquisition” or “Foreign Language Learning.” Do we learn other languages or acquire them like we did our native language? Many of these questions and assumptions go to the problem of instructions. Probably, because either learning or acquiring a new language - “symbol code” - is directly connected to the way this information is given to learners.

Generalized and simplified, there are two major streams of instructions: implicit and explicit. The implicit method, which involves natural skills to process language, was officially presented during the Second World War. That was the so-called “Audiolingualism” or audiolingual method where the emphasis is made on grammar, speaking, and listening through multiple repetitions (Ellis, 2011, p.36). In the 1960s, it was a counterbalance to Grammar Translation method, a rule-governing approach, where detailed explanation provided a stable basis for understanding and translation from L1 to L2 and back guaranteed teaching success. Both streams have been changing gradually within last decades. As Sanz and Morgan-Short (2005) mention in their article “Explicitness in Pedagogical Interventions: Input, Practice, and Feedback,” the more metalinguistic interventions the approach uses, the more it can be inclined to explicit method; and on the contrary, the more “naturalistic” input is directed to learners, the more implicit it is (p. 235).

Although there are some of more well-known and popular L2 methods such as the Cognitive Code method, Natural, Communicative methods, the general issue of quality and results are still unsolved. Recently, SLA researchers have started conducting empirical experiments to draw conclusions about whether educators have to use an explicit or implicit approach. The majority of the studies show that the implicit method might be most effective and successful for L2 learners (Greenwald et al., 2003). Although some recent pedagogical research criticizes the explicit teaching method, it still can be relevant in certain situations. To shed some light on this key issue, this paper will weigh pros and cons to examine modern tendencies either to explicitness or implicitness. It aims to analyze modern SLA research and demonstrate most significant advantages and constraints of explicit and implicit approaches.

One of the main arguments of implicit language teaching supporters is activation of analytical ability. One of the key studies which present and prove this argument is the research of the cognitive psychologist Reber, who conducted a study where participants got strings of letters (Sanz and Morgan-Short, 2005). The first group of subjects had to search for rules in the given texts; in some cases rules were provided in advance. The second group was exposed to implicit method, and to memorization of the strings of letters particularly. After the memorization, participants of group 2 were exposed to the presence of the certain rules, but they were not discussed directly. The results of the experiment have shown that the implicit group of participants demonstrated better understanding of the material and was able to generalize new knowledge to new letter strings. This experiment demonstrated that the implicit method let learners develop a wide conscious context of a situation instead of concentrating on one case and transmission of a chunk of knowledge without awareness of how to modify it. Moreover, based on the mentioned above argument, it is possible to assume that the implicit impulse can also

stimulate active thinking and even active analyzing of native and second languages. In this case implicit, cross-linguistic difference or cross-linguistic similarities can influence results of L2 learning significantly (Lauferal and Eliassona, 1993) and even give rise to sense of intuition.

Thus, the issue of teaching grammar will remain questionable. Traditionally, grammar is defined as a set of rules, according to which we can construct some schemas to code our thoughts. With help of this unified set of rules our recipients can decode the information and process it. The opponents of strict implicit teaching claim that L2 learners will not be able to develop a language intuition without an explicit stimulus if grammar is a more or less fixed set of rules. Scott (1989) draws our attention to the importance of grammar teaching and insists that an exclusively implicit approach does not work in grammar teaching (p. 14). The subjects of his study were thirty-four students from advanced French class. The experiment was organized in two steps (two classes). The first class was focused on the relative pronoun, while the second class was focused on the subjunctive structures. One group of subjects was exposed to an implicit methodology; the second – to an explicit. The result of the experiment demonstrated oral, written, and total scores after the teaching session. Although in the oral section participants scored equally, the written performance was significantly better in the explicit group in both subjunctive and relative pronouns classes. The results of this study prove the assumption of the researchers that the implicit teaching approach cannot guarantee positive results in all aspects of SLA. Based on the examples discussed above, it is important to emphasize that the explicit method did not yield the implicit approach in spoken part and, moreover, it showed more effective results in written language testing.

The mentioned arguments and counterarguments lead to the question about the product of the instructions, or in other words, knowledge gained after certain types of instruction.



Unfortunately, this question is extremely hard to answer, as long as humans will not be able to read someone else's mind. To simplify the task, it would be reasonable to set some borders and narrow down the expectations. Based on the possible data, we can focus on the relative quality of the gained knowledge after the implicit or explicit exposure. In other words, if the gained knowledge can be regarded as long-term product, it will be considered effective, and, consequently, better. One of the possible assumptions is that we may learn an L2 as we learned our native language, and exactly from our environment without any explanations and rule-directed instructions. For a better understanding of this assumption, it would be logical to demonstrate some features of native language acquisition. A striking example of human's speech abilities is the experiment of Gleason (1958), conducted more than 50 years ago. The participants of her experiment were young children (24-36 months old). To guarantee that children have never heard vocabulary they will be tested on, the researcher made-up a word "wug", and its picture – a quite primitive figure with eyes. The children were shown a set of pictures with wugs. The experimenter told them: "This is a wug! Now there is another one! Now there are two of them! There are two \_\_\_\_\_". Interestingly, majority of young children got the plural system of English correct, even without any official explanation. The logical question continuing after this experiment is whether adults can learn an L2 the same way, for instance, using the full immersion method. In an idealistic case, we could go to live, for instance, in Vienna for couple of months or even years and start speaking the Austrian variety of German fluently without any formal input. If that were real, the role of any instructions at all would be minimal, if at all. Unfortunately, for some reason adults fail to acquire a new language without any formal instruction. The naturalistic method per se does not live up to our idealistic hopes.

The arguments discussed above, which defend either explicit or implicit approaches, allow us to conclude that neither explicit nor implicit teaching mode can be regarded as autonomic and independent. And as long as experts keep looking for a perfect way of SLS, it is pivotal to assume that both methods should be combined in order to achieve success in SLA.

## **CHAPTER 5: RESEARCH QUESTIONS**

This aim of the experimental research is to investigate L2 vocabulary learning processes. In particular, it concentrates on the learning of German compound nouns, which can often be a source of confusion for learners. The experiment aimed to investigate the following questions:

(1) Which instructional strategy (explicit or implicit) is most effective for students of German to achieve success in the usage of compound nouns in German? (2) How well do learners apply their knowledge of grammatical rules about the formation of compound nouns in novel contexts? (3) How can the study results lead to improvement of L2 instructional methods for vocabulary teaching, in particular?

## CHAPTER 6: METHODS

### 6.1 Participants

For the experiment, I recruited students from the University of Illinois at Urbana-Champaign. All of the participants are enrolled in a German language course. Before participating in the experiment, they completed the equivalent to at least one semester of German language at the university level. Students from each level were assigned to the three groups ( $N = 92$ ). The Group 1 ( $N = 17$ ) was exposed to explicit instruction (explicit group). Group 2 ( $N = 17$ ) was exposed to the implicit instruction (implicit group). Group 3 ( $N = 17$ ) was a control group which did not get any formal instruction.

Another three groups were admitted into an intermediate level of German - GER 103. They had minimum two semesters of German language or its equivalent. As in the previous groups of participants, GER 103 students were divided into explicit ( $N = 16$ ), implicit ( $N = 14$ ), and control group ( $N = 11$ ), respectively. Every student who participated in all phases of the experiment received one extra point for their German course 102 or 103 depending on the current enrollment.

Written informed consent was collected from each student to participate in the experiment in accordance with guidelines from UIUC Institutional Review Board, which approved the study.

A summary of the background data is found in Table 6.1 and Table 6.2.

**Table 6.1** “GER 102 Participant Demographics.”

	Explicit	Implicit	Control
Total	17	17	17
Gender	female (11) male (6)	female (8) male (7)	female (6) male (11)
Age	18-19 (3) 20-22 (10) <23 (4)	18-19 (8) 20-22 (7) <23 (2)	18-19 (4) 20-22 (9) <23 (4)
English is a native language	12	15	14
Other native language	5	2	3

**Table 6.2** “GER 103 Participant Demographics.”

	Explicit	Implicit	Control
Total	16	14	11
Gender	female (7) male (9)	female (6) male (8)	female (4) male (7)
Age	18-19 (8) 20-22 (6) <23 (2)	18-19 (5) 20-22 (4) <23 (5)	18-19 (4) 20-22 (5) <23 (2)
English is a native language	14	10	8
Other native language	2	4	3

## 6.2 Instruments

For the experiment, I prepared a set of testing materials which were focused on identification of initial knowledge and control of gained knowledge after presentations for implicit, explicit or control groups. For these purpose I analyzed vocabulary list provided by the instructors. I extracted 40 words which students learned in the previous semester or two semesters depending on their enrollment. Vocabulary was collected exclusively from the textbooks used in the previous semesters: “Kontakte. 6<sup>th</sup> Edition” (Tschirner, 2008) “*Vorsprung*” (Lovik, 2012). No additional material for testing was used. This set of vocabulary was used in all phases of the experiment.

For presenting the new topic “compounds in German”, I used two PowerPoint Presentations. The first PowerPoint Presentation (explicit) demonstrated main tendencies in lexical and grammatical features of German compounds, including identification of gender and plural and connecting particles between the components in compounds. Every rule was explicitly indicated on the screen and the rules were explained in full sentences. After every rule there were at least two examples. A set of short quiz questions followed after every section of rules (e.g. *baden + die Wanne = ?* or *das Bad + die Halle = \_\_* ). No nouns from the familiarization list were used as examples or quiz questions. The second PowerPoint presentation showed a short story which used a word play which was focused on compiling different compound units. It was intended to show how limitless this process can be. After the story, an implicit presentation included also a set of examples of compound nouns. No explicit rule explanation was applied in the second presentation. After the presentation as well as in the first one, I designed a short quiz (e.g. *das Zentrum + die Kultur = ?*). No compound nouns from the presentation were used in the tests.

The next procedure was a set of testing exercises. For the first test, I compiled eleven compound nouns which included transparent and opaque compound nouns. The describing and main parts of compound nouns were formed from the initial list of words. The second test consisted of fourteen pictures and ten compound nouns for students currently enrolled in GER 102 and seventeen pictures and fourteen compound nouns for students currently enrolled in GER 103. Students had to match pictures and compound nouns. Same set of compound nouns needed to be used in the following exercise to fill in the blanks. Students should have chosen only six compound nouns out of twelve in GER 102 and only ten out of fifteen in GER 103. After the completion of the models, volunteers from each group could participate in an interview which was designed according to a “think aloud” method. Students had to formulate their interpretation of basic rules of compound noun formation in German and their way to translate these compounds.

For the delayed test for GER 103, I modeled a set of fourteen compound nouns and a short text. Students had to write down articles for each compound noun and then choose ten from the same list to fill in the blanks of a short text. The structure of the GER 102 test was analogous. The set of compounds consisted of ten units. Students needed to use only five from this list to complete a short text.

### **6.3 Experimental Procedures**

The experiment was held during one of the class sessions of GER 102 or GER 103. It was conducted in the classroom where the course was normally scheduled. No special preparation training was needed had for the participants. All participants received 0.5 point of extra credit for participating in the study. Students who volunteered to participate in the interview got additional

0.5 point of extra credit towards their final grade. (This amount of extra credit represented what was typically given for students' participation in extracurricular activities.)

The experiment for all groups consisted of three phases. First, they participated in the familiarization phase in which they got a list with vocabulary which they had learned in the previous semester. Explicit, implicit, and control groups had to underline familiar lexical units. The list provided nouns with articles and verbs. It was assumed that all students learned and remembered all words.

The training and experiment were conducted two days after the familiarization phase. The explicit 102 and 103 groups of participants were exposed to detailed explicit instruction through a PowerPoint presentation and comments of the researcher. The presentation included a theoretical basis, explanation of rules, examples, and a short question. The researcher commented on all the slides but did not give any feedback after the short questions. The procedure for the explicit GER 102 and 103 groups was identical. The presentation lasted seven minutes.

Contrary to the explicit groups, the implicit groups were exposed to a PowerPoint presentation which did not demonstrate the topic in great details. The researcher presented new material about compound noun structure in German using exclusively the implicit method. The number of examples was 25% more than in the explicit method. Similarly, the researcher presented a set of short questions. The participants did not receive any feedback about correctness of their answers. In contrast to the explicit and implicit groups, the control groups did not receive any formal instruction.

After the presentations had been completed, the participants were given a test which included a translation test, a picture-matching test, and 'fill-in-the-blank' test. First, all groups



received a translation task where they had to translate a set of compound nouns into English. No examples from the presentations were used in the tests. The participants had five minutes to complete the test. After the task had been finished, the sheets were collected immediately. The researcher distributed the next set of handouts. The handout consisted of two pages with one task per page. The first task asked students to match pictures and complex compound nouns. The set of compound nouns was greater than the number of pictures. Every picture matched with only one noun. For the second task the participants received a text with several blanks. They needed to insert the nouns from the previous exercise into the blanks. The testing phase lasted eight minutes. After the test had been completed, all worksheets were collected.

After finishing the test, the volunteering subjects from the explicit, implicit and control groups participated in a think-aloud interview (total N = 25). According to this strategy, I asked each participant to answer two questions about the process of a task-completion “What strategy did you follow to complete this test? What is the rule of compound noun formation in German?” They had to explain what they were thinking when solving this cognitively demanding task. Each participant had from one to two minutes to explain his or her thinking processes. The interviews were conducted individually. I took notes while students explained me the rules of German compound nouns formation and their strategies.

The last phase of the experiment was a delayed test. The subjects were exposed to a novel set of compound nouns which were formed from the initial set of vocabulary from the familiarization phase. No novel lexical units were used, and no additional presentation was shown. Students had to fill in the blanks with articles to German compound nouns. It was supposed that participants were familiar with all individual lemmas. No extra materials such as pictures were provided. The researcher distributed a text with several blanks. The explicit,

implicit and control group subjects had ten minutes to fill in the blanks from a set of compound nouns provided. All worksheets were collected after the task was done.

## CHAPTER 7: ASSESSMENT PROCEDURE AND RESULTS

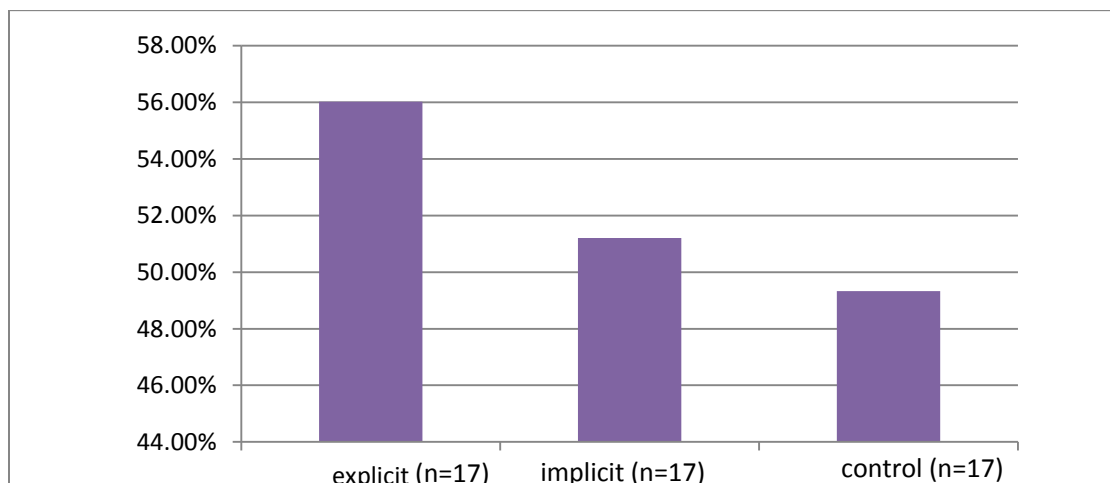
The written tests were graded by the researcher according to the grading scale. Every segment of the tests was taken into account and counted as one point. The number of individual tasks was counted as the maximum score. For each learner, an individual score was calculated at each task of testing. For every section of the test, the scores could range from 0–100%. The average score was calculated for the explicit, implicit, and control groups.

The translation task consisted of eleven opaque and transparent compound nouns for GER 102 and fourteen for GER 103. For every correct translated compound noun, students could receive one point. If only one of the components were translated correctly, a student received 0.5 points.

The descriptive statistical data show that after the explicit instruction, students in German 102 were able to gain a higher score than implicit and control groups, respectively. The explicit group identified main components from the describing unit, recognized similar or parallel structures in English, and cognates 5% more than the implicit group.

**Table 7.1** “Mean results of the translation test in GER 102” (n= 51)

Standard deviation (SD): 0.071 (explicit group), 0.17 (implicit), 0.2 (control)



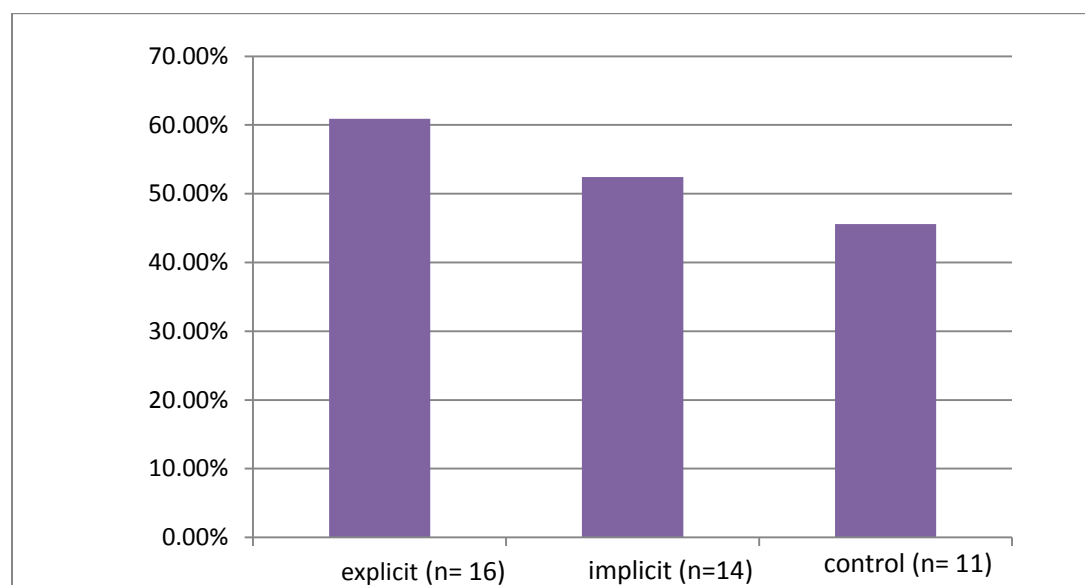
Individual findings report difficulties translating opaque compounds as for example, *das Trinkgeld*. In most cases, students were able to identify the compounds, but only few knew exact meanings of the words. Some versions of fallacious translation were “drinking cup” (1) (correct literal translation of the first component); “drink money or drinking money” or “money for drinking” (literal translation of two components, 27 out of 51 translations); “expensive drink” (1) (error in identifying main and describing components, an attempt to translate metaphorically). Only eight participants received full credit for translating the compound “*das Trinkgeld*.”

Translations of words which have two or more meanings also elicited difficulties among many students. One of such examples is “*die Manteltasche*.” In most cases students recognized individual units but failed to construct correct combination of components. For instance, “coat bag” (9) (literal translation of components); “coat purse” (3) (literal translation of components); “bag for a coat” (2) (an attempt to identify purpose of the item, literal translation of both components).

Similar tendencies were found in GER 103. The explicit group demonstrated the highest score. They were aware of strict compound structure in Germanic languages and were able to follow it. The misuse of the main component and the describing unit was not shown in the explicit group.

**Table 7.2** “Mean results of the translation phase in GER 103” (n=41)

SD: 0.11 (explicit), 0.16 (implicit), 0.13 (control)



Nevertheless, the discrepancies between groups are not distinctive. It can be explained by the level of proficiency. All three groups were exposed to official instructions in German for at least two semesters. The experience and practice might have helped them to score high without taking into consideration type of presentation or the absence of the instruction.

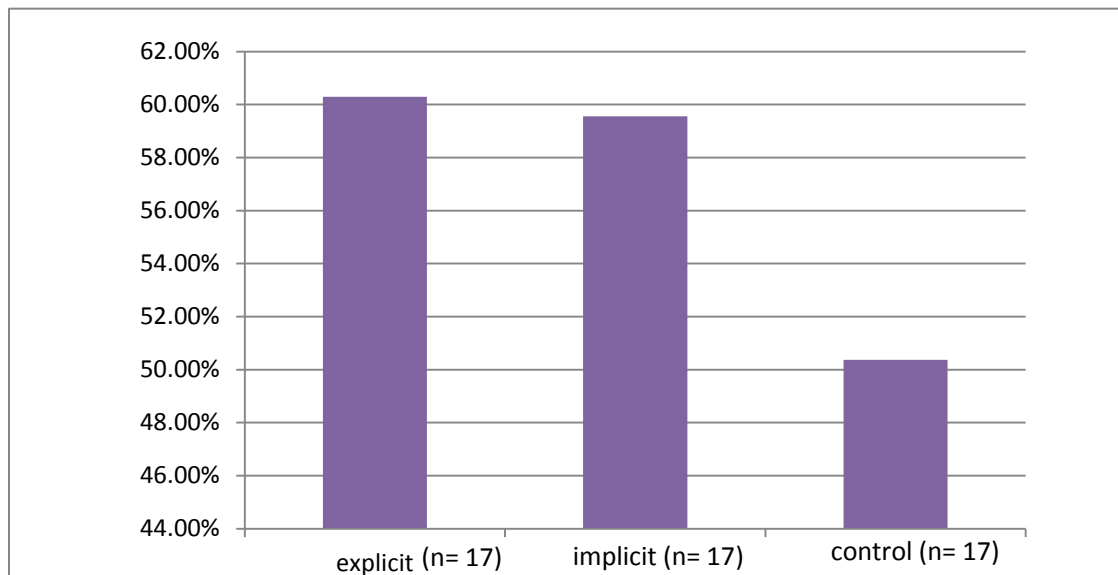
Admittedly, the opaque compounds caused difficulties in translation in all groups. Knowing components of compound nouns lead students to misunderstanding and literal translation. For instance “*die Spechstunde*” was translated as “talking/speaking hour” (10), “speech/language study” (3), “discussion hour/class” (5), “language student” (1). From these examples it can be seen that students were familiar with the direct meaning of compound units, but they could not find an equivalent for the compound as a whole. A similar situation was provoked by the compound noun “*das Fahrrad*” despite that this compound belongs to the beginning stages of vocabulary which students learn during the first semester of German as a foreign language. The noun was translated as “driver” (2), “motor bike” (5), “drive wheel” (2)

and “travel wheel” (1). Students were probably confused by the describing unit “Fahr-” which implies some movement with help of an engine. Nevertheless, 34 students translated the compound noun correctly.

Interestingly, in spite of the fact that the set of compound nouns in the translation phase and test 1 were the same, the test 1 revealed statistically different results (Table 5). In GER 102, the explicit group performed 60.3% of correct answers and the implicit group demonstrated 58.5%. Despite some difficulties in translating the compound nouns in the translation test, students completed the picture-matching test with great ease. The results can be explained by the fact that all groups had an access to visual content. Furthermore, the number of answers was limited. Consequently, the probability to receive full credit was higher.

**Table 7.3** “Mean results of Test 1 in GER 102” (n=51)

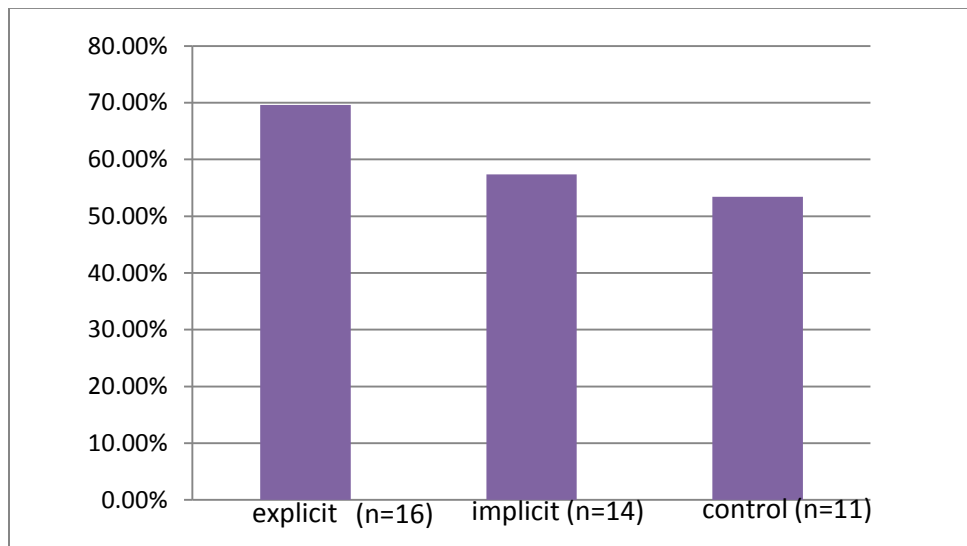
SD: 0.15 (explicit), 0.11 (implicit), 0.13 (control)



However, in the translation phase the opaque compound noun provoked some confusion in the picture matching assignments and in the fill-in-the-blank test. For instance, “*der Kulturbeutel*” was a stumbling block in the translation phase as well as in test 1. Students identified this compound noun with “culture center” (6), “culture place” (2), “cultural difference” (2) or just “culture” (4). Similarly, they failed to recognize a picture demonstrating a “*Kulturbeutel*” and could not use it correctly in the test regardless of the type of instruction. In contrast, GER 103 groups revealed a distinction where the explicit group scored 12.26% higher than the implicit group both in picture matching and filling-in-the-blanks tests.

**Table 7.4** “Results of Test 1 in GER 103” (n=41)

SD: 0.12 (explicit), 0.15 (implicit), 0.32 (control)



After the test, volunteers participated in a short interview. The task-based interviews were transcribed by the researcher. Any segment that the researcher understood as ambiguous was considered unintelligible and was not considered for coding and analysis. It was necessary to discard 2.5% of the data. The assessment of the interviews was analyzed by the cumulative approach dividing them into three groups (explicit, implicit and control) and extracting main tendencies.

## 7.1 Results of “think aloud” interviews

The first question of the interview was to describe the main rule of compound noun structures in German. Participants from the explicit group recalled some of the presented passages from the presentation. Among others, they explicitly described that compound nouns usually consist of two or more components which are hierarchically different. All five participants from the explicit group also stated that the main unit identifies the gender and the singular/plural form of a compound noun. In addition, four of five mentioned different connecting particles between the compounds and included examples to their answers. For instance, a participant illustrated her explanation with example “*Haupt – Bahnhof(s)– Uhr*”, a compound noun which consists of three components. Interestingly, the student did not recognize “*Bahnhof*” as a compound noun. This can be clarified by the assumption that she learned it as a separate or non-compound noun in the beginning stages and did not question it as a compound.

Compared to the explicit group, the implicit group did not demonstrate an explicit awareness of grammatical rules. All five participants claimed that to use compound nouns in German, one should know meaning of every component and try to find an equivalent or cognate in English. Interestingly, three of five students mentioned also that it is of great help that German and English belong to the same language group and share similarities in compound noun formation. It is worth mentioning that five subjects referred to “logic” or to something that “makes sense.”

Only two of the subjects recognized any grammatical characteristics of compound nouns in German. While explaining them, participants mostly used examples and built their explanations around them. For example, “we can break a compound “*Trinkgeld*” into two



sections: “*trink-*” and “*Geld.*” Then, we can find the main word and the describing one...so it sounds as a cognate...it is ‘*an expensive drink*’” (Participant 4, implicit group).

In contrast to explicit and implicit groups, the students from the control group stated that to understand German compound nouns, it is necessary to split them into “chunks” or “separate words.” After splitting, one needs to understand every component separately and then to find an equivalent which will “make sense” (Participant 2, Participant 3 control group). They also supposed that to construct a compound noun, one should fuse two words together. No information about articles, gender or connecting particles was mentioned.

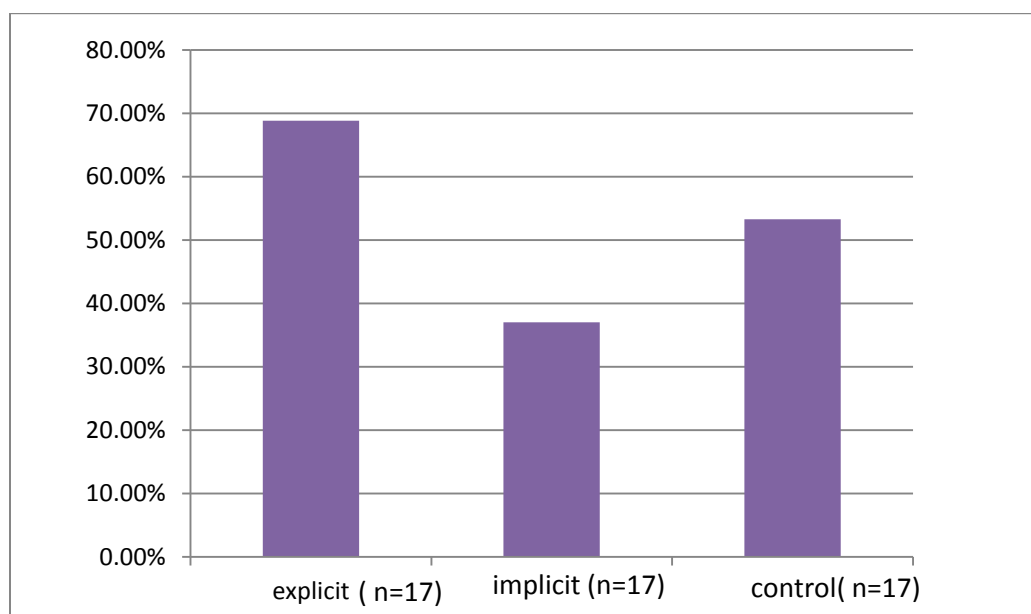
The results of the “think aloud” interview revealed interesting details about the processing of compound nouns by students. The data of the interview demonstrated that the explicit group paid attention to structural characteristics of compound nouns while the implicit group tried to find a logical equivalent or cognate in English. Finally, the control group showed the lowest level of awareness and did not demonstrate full understanding of the linguistic concept.

## **7.2 Results of the delayed test**

The final phase of the experiment was conducted two days after the presentation. No additional or new material was presented. The participants needed to write an article for compound nouns. After the completion of the first test, they used the same compound nouns to fill in the blanks. The results of the delayed test showed that the explicit group excelled two other groups. The explicit group scored 68.86% while the control group received 52.29% and the implicit – only 37.02%. In each case, there were large deviations among participants which were indicated in wide variation of scores. Overall, the results suggest that after the explicit instruction, students scored higher.

**Table 7.5** “Mean scores on delayed test (GER 102)”

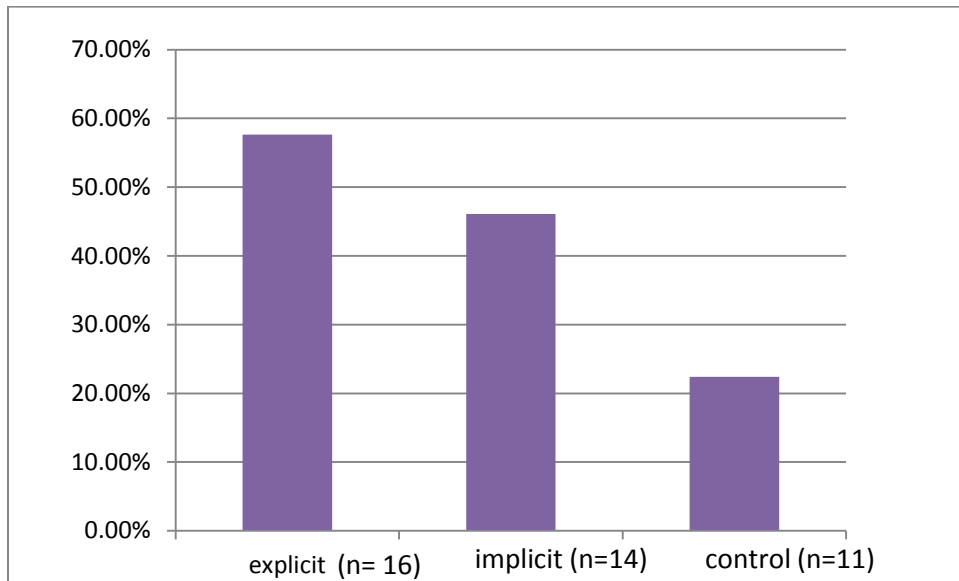
SD: 0.13 (explicit), 0.16 (implicit), 0.23 (control)



The final results of GER 103 were overall lower than in GER 102. This could happen because the GER 103 test was longer with more fill-in-the-blank questions. Despite the scores, the results showed a similar picture where the explicit group showed greater score in the delayed test. Most widespread repetitive mistakes of the explicit group were using such compound nouns as “die Fahrstunde” and “der Führerschein” or “das Universitätsende” while in the implicit and the control groups it was hard to observe a certain pattern. I believe that this trend is based on the explicit knowledge of structural features of compound nouns. Knowing that they should expect a connecting particle in compound nouns, students from the explicit group failed to recognize familiar lemmas, for instance, “Fahr(s) - tunde” instead of “Fahr - stunde.” Overall, the statistics revealed that explicit instruction was beneficial for students. The implicit group performed 10% lower than explicit. Finally, the control group scored only 22.41% total.

**Table 7.6** “Mean scores on delayed test (GER 103)” (n=41)

SD: 0.13 (explicit), 0.15 (implicit), 0.09 (control)



## **CHAPTER 8: DISCUSSION**

This study was designed in order to deal with the question of how to teach compound nouns in German. For this purpose, I divided participants into three groups: explicit, implicit and control. The experiment was conducted for GER 102 level when students had at least one semester of formal instruction and for GER 103 when students had two semesters of instruction in German as a second language. The testing component consisted of translation test, picture matching and filling-in-the-blanks assignments which were conducted as a post-test after explicit, implicit treatment or no additional treatment. The main difference between the treatments was in the content of the presentation about compound nouns in German. Under the explicit conditions, the students were explained main grammar rules of the targeted structure; while under the implicit conditions, the participants listened to a story which presented compound nouns. All groups were aware of the topic and targeted structures to avoid any discrepancy. The results of the experiment reported important information of how German compound nouns should be taught in the university level environment. The data of the experiment can provide vital details to modern lesson plans of German as a second language.

Although it is widely common to teach vocabulary by the implicit method, the students of the explicit group were essentially more successful in the translation phase. It provided evidence that students benefited measurably from a detailed, organized presentation under the explicit conditions.

An effective implementation of the explicit method in compound noun teaching might be explained by three different reasons. First of all, all participants were 18 year old and older. This meant that all of the students had a vast learning experience including learning foreign languages and grammar rules in their own L1. If they learned foreign languages and other subjects

explicitly, they became accustomed to this method and knew how to deal with this type of information. Consequently, any new method would not be accepted by the majority as effective or it would take more time to get used to.

Furthermore, as it was discussed earlier, a compound noun in German is a complex fusion of two or more lemmas. The structure needs to be understood not only on the semantic level as for regular nouns but also on the morphological level. Sometimes it is useful to compare a compound to an independent syntactic structure because of its complex meaning which might need to be translated into English as a whole sentence. Although some students in the implicit and control groups were able to identify the structural features correctly, their decisions were unconscious, intuitional and, therefore, as the results showed, unstable. Consequently, in order to support their intuition and achieve statistically significant results, instruction needs to include explicit components.

In addition, the explicit group students were at advantage in comparison to the implicit groups because of temporal conditions. The students who listened to the explicit presentation had more time to consider, process, and “digest” new material. Their presentation was strictly focused on compound nouns. They were presented the rules with examples extracted from hundreds of other rules and examples. Subsequently, they did not have to spread their focus to other aspects. In contrast, the implicit group needed to spread their attention to the meaning of the presented story and then only on the new structure. Consequently, the explicit group was at an advantage which could positively influence their performance.

The test 1 as well as the delayed test demonstrated similar results. Moreover, the results of the “think aloud” interview revealed that participants of the explicit group were aware of most grammar structures such as gender, plural/singular and main as well as describing components.

They were able to give examples and comments on them. On the contrary, the participants of the implicit group based their answers on the examples and did not identify most of the grammatical features. For this reason, I can assume that these results support the value of explicit instruction.

Nevertheless, while the results of this study suggest advantages of the explicit method over implicit, it is worth admitting that they are relevant only for transparent compound nouns. In other words, after the explicit presentation, the students demonstrated higher scores by using only transparent components. The usage of opaque compound nouns was hard for all groups without regard to the treatment. This means that compound noun teaching strategies for opaque compound nouns have to be defined separately. In addition, further studies are needed to determine which instruction is most useful and effective for such cases.

## **CHAPTER 9: LIMITATIONS AND FUTURE RESEARCH**

There are aspects of the study which could have been improved and can contribute to the future studies. Limitations include a small randomized pool of participants, limited teaching methods and assessment criteria. Due to the limited time and capacity, the study was conducted by one researcher who also was aware of the previous research and anticipated results.

It is important to mention that there are various aspects of the vocabulary teaching. The choice of instruction is not limited to the explicit and implicit methods. It is obvious that it is impossible for researchers to take into consideration all these methods because of the time constraints. Furthermore, the assessment of students' knowledge was restricted by standard testing. It would have been beneficial to include different types of knowledge-checking, such as conversations in pairs or small groups or more creative written assignments which can allow students to work creatively and trigger explicit and implicit knowledge.

It is essential to dedicate more attention not only to group studies, but also to individual case studies which will help identify the importance of individual differences and to evaluate teaching conditions other than classroom environment. Finally, in order to make a direct influence on the classroom setting, it is necessary to provide more statistical data. For further research, it is important to engage a larger pool of participants, including different levels of proficiency. More statistical data, both inferential and descriptive, should help to provide more distinct and clear results.

Ultimately, the limitations of the current project can be addressed in the future research in order to better understand the research area and its issues. Taking into account the discussed limitations, for the future research I suggest focusing on a larger pool of participants including higher levels of proficiency. The comparison of the low intermediate level with the low

advanced level could reveal interesting results in German compound noun teaching, such as higher intuitive skills.

Furthermore, future studies should consider a close analysis of opaque versus transparent in the context of explicit and implicit teaching method. The results of the current study revealed that different types of compounds cause different levels of difficulty. Consequently, they also require different teaching approaches.



## **CHAPTER 10: PEDAGOGICAL IMPLICATIONS**

The results of the experiment carry important implications for learners of German as a second language. These data can be used by curricular designers and foreign language teachers in a number of ways. First, the study suggested that the explicit instruction can be a successful tool for the acquisition of compound nouns in German. While the implicit method of the communicative teaching approach is dominating basic language programs, explicit methods are viable and need to be accounted for in course design. Therefore, the highest results are achieved through the combination of both methods within the same classroom. The participants consisted of students from different study backgrounds: those, for whom German is not the first foreign language and those, for whom it is. This clearly demonstrates that the typical classroom is not homogeneous, which underlines the importance of creating a balance between different instructional methods. More specifically, this paper investigated the instruction of opaque and transparent compound nouns. The findings advocate that opaque compound nouns are better perceived and acquired with explicit teaching techniques. Compound nouns are a large word category in German language and special attention needs to be paid to this structure by the teacher.

## CHAPTER 11: CONCLUSION

The ability to speak is a unique gift of humans which comes naturally without formal instruction. This ability is often taken for granted. The appreciation of the complexity of a language comes to people later when people start learning a foreign language. Of course, one can say that this is a matter of talent and motivation. I argue with this point of view and claim that foreign language learning depends on various aspects and is a highly complex topic. The present paper is an attempt to take a look at the modern pedagogy in the field of foreign languages. In particular, it is dedicated to the problems of German as a second language in an American classroom. It focused on the question what is the most effective method to teach compound noun structures in German as a second language.

The issue of compound noun learning in German as a foreign language needs to be discussed taking into consideration several layers. First of all, this is the understanding of our biological characteristics, in other words, how the brain acquires a foreign language. The recent research showed that left hemisphere which is responsible for our native language abilities also is in charge of foreign a language. Moreover, the brain areas of a foreign language tend to depend on the proficiency level of a language. The more advanced is the knowledge; the more similar is the brain map to a native language.

Consequently, to compensate for disadvantages of the biological flaws of naturalistic method, explicit pedagogy should come into play. Taking this assumption into consideration, I claim that at the beginning stages of German it is necessary to include not only widely accepted implicit method but also the explicit. To shed light on this problem, the experiment was designed for two levels of the basic German program. GER 102 and GER 103 were divided into explicit, implicit and control groups. The participants were presented a PowerPoint presentation under

explicit or implicit conditions. After the presentation, the groups were tested on translation skills of compound nouns and on using them in the texts. The results of the study showed that the explicit method was the most successful in comparison with implicit and control groups which emphasize the initial hypothesis.

The results of the conducted study elicited important tendencies for compound nouns acquisition in second language learning. The study may be taken into consideration by instructors of basic German courses for creating appropriate teaching techniques. The paper, in general, contributed to the compound noun teaching methods and showed its complexity and ambiguity.

## REFERENCES

- Abutalebi, J., Della Rosa, P. A. (2013). How the Brain Acquires, Processes, and Controls a Second Language. In Faust, M. (Eds.), *The Handbook of the Neuropsychology* (516-538). Blackwell Publishing Ltd.
- Abutalebi, J., Cappa, S.F., & Perani, D. (2001). The bilingual brain as revealed by functional neuroimaging. *Bilingualism: Language and Cognition*, 4, 179-190.
- Badzakova-Trajkov, G., Häberling, I. S., Roberts, R. P., & Corballis, M. C. (2010). Cerebral Asymmetries: Complementary and Independent Processes. *Plos ONE*, 5(3), 1-9.
- Birdsong, D. (2006). Age and Second Language Acquisition and Processing: A Selective Overview. *Language Learning*, 569-49.
- Buchweitz, A., & Prat, C. (2013). The bilingual brain: Flexibility and control in the human cortex. *Physics of Life Reviews*, 10, 428-443.
- Carramazza, A., & Zurif, E. (1976). Dissociations of algorithmic and heuristic processes in sentence comprehension: Evidence from aphasia. *Brain and Language*, 3, 572-582.
- (2009) Duden :die Grammatik : unentbehrlich für richtiges DeutschMannheim : Dudenverlag.
- Dr. Seuss. 1965. *Fox in Sox*. New York: Random House, p.51.
- Ellis, N.K. (2011). Explicit and Implicit SLA and Their Interface. In Sanz, C. & Leow, R. P. (Eds.) *Implicit and explicit language learning conditions, processes, and knowledge in SLA and bilingualism* (pp. 35-48). Washington, DC: Georgetown University Press.
- Fedorenko, E., Nieto-Castanon, A., & Kanwisher, N. (2012). Syntactic Processing in the Human Brain: What We Know, What We Don't Know, and a Suggestion for How to Proceed. *Brain And Language*, 120(2), 187-207.
- Genesee, F., Center for Research on Education, D. A., & ERIC Clearinghouse on Languages and Linguistics, W. C. (2000). Brain Research: Implications for Second Language Learning. *ERIC Digest*.
- Gleitman, L. R., & Wanner, E. (1982). Language Acquisition: The State of the Art. In E. Wanner, L. Gleitman (Eds.), *Language Acquisition: The State of the Art* (pp. 3-48). Cambridge: Cambridge UP.
- Forgács, B., Bohrn, I., Baudewig, J., Hofmann, M. J., Pléh, C., & Jacobs, A.M. (2012). Neural correlates of combinatorial semantic processing of literal and figurative noun noun compound words. *Neuroimage*, 63(3), 1432-1442.
- Fromkin, Victoria. Rodman, Robert. (1974). *An introduction to language*. New York, Holt, Rinehart and Winston.
- Graefen, G., & Liedke M. (2012). *Germanistische Sprachwissenschaft*. Tübingen, Germany: A. Franke Verlag.

- Green, D.W. (2003). The Neural Basis of the Lexicon and The Grammar in L2 acquisition. In R.van Hout, A. Hulk, F. Kuiken & R. Towell (Eds.), *The interface between syntax and the lexicon in second language acquisition* (pp. 197-218). Amsterdam: John Benjamins.
- Greenwald, A.G., Nosek, B. A.& Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology*, 85(2), 197-216.
- Hernandez, A. E., Hofmann, J., & Kotz, S. A. (2007). Age of acquisition modulates neural activity for both regular and irregular syntactic functions. *Neuroimage*, 36(3), 912-923.
- Ickler, T.(1997). *Die Disziplinierung der Sprache*. Tübingen: Narr
- Isel, F., Gunter, T. C., & Friederici, A. D. (2003). Prosody-Assisted Head-Driven Access to Spoken German Compounds. *Journal Of Experimental Psychology. Learning, Memory & Cognition*, 29(2), 277-288.
- Johnson, J.S., & Newport, E.L. (1989). Critical Period Effects in Second Language Learning: The Influence of Maturational State on the Acquisition of English as a Second Language. *Cognitive Psychology*, 21(1), 60-99.
- Kim, K. S., & Relkin, N. R. (1997). Distinct cortical areas associated with native and second languages. *Nature*, 388(6638), 171.
- Klein, D., Milner, B., Zatorre, R. J., Meyer, E., & Evans, A.C. (1995). The Neural Substrates Underlying Word Generation: A Bilingual Functional-imaging study. *Proceeding of the National Academy of Sciences*, 92(7), 2899-2903.
- Laufer, B., & Eliasson, S. (1993). What Causes Avoidance in L2 Learning: L1-L2 Difference, L1-L2 Similarity, or L2 Complexity?. *Studies In Second Language Acquisition*, 15(1), 35-48.
- Mårtensson, J., Eriksson, J., Bodammer, N., Lindgren, M., Johansson, M., Nyberg, L., & Lövdén, M. (2012). Growth of language-related brain areas after foreign language learning. *Neuroimage*, 63(1), 240-244.
- Libben, G., Gibson, M., Yoon, Y., & Sandra, D. (2003). Compound fracture: The role of semantic transparency and morphological headedness. *Brain & Language*, 84(1), 50.
- Libben, G., Weber, S., & Miwa, K. (2012). P3: A technique for the study of perception, production, and participant properties. *Mental Lexicon*, 7(2), 237-248.
- Lovik, T.A., Guy J. D., & Chavez, M. (2012). *Vorsprung: A communicative introduction to German language and culture*, 3<sup>rd</sup> Ed. Australia: Cengage Learning.
- MacGregor, L.J., & Shtyrov, Y. (2013). Multiple Route for Compound Word Processing in the Brain: Evidence from EEG. *Brain and Language*, 126 (2), 217-229.
- McDonald, J. (2000). Grammaticality Judgments in a Second Language: Influences of age of acquisition and native language. *Applied Psycholinguistics*, 21, 395-423.

- Paradis, M. (2000). Generalizable outcomes of bilingual aphasia research. *Folia Phoniatrica et Logopaedica*, 52, 54–64.
- Park, H. P., Badzakova-Trajkov, G., & Waldie, K. E. (2012). Language Lateralisation in Late Proficient Bilinguals: A Lexical Decision fMRI Study. *Neuropsychologia*, 50(5), 688-695.
- Pitres, A. (1895). Etude Sur l’Aphasie Chez les Polyglottes. *Revue de medicine*, 15, 873-899.
- Raffray, C. N., Pickering, M. J., & Branigan, H. P. (2007). Priming the interpretation of noun-noun combinations. *Journal Of Memory & Language*, 57(3), 380-395.
- Setola, P.P., & Reilly, R.G. (2005). *Words in the in the Brain’s Language: An Experimental Investigation*. Brain and Language.
- Sanz, C., & Morgan-Short, K. (2005). Explicitness in Pedagogical Interventions: Input, Practice, and Feedback. In C. Sanz (Ed.), *Mind and Context in Adult Second Language Acquisition: Methods, Theory, and Practice* (pp. 234-263). Washington, DC: Georgetown UP.
- Scott, V. M. (1989). An Empirical Study and Implicit Teaching Strategies in French. *Modern Language Journal*, 73(1), 14.
- Snow, C.E., & Hoefnagel-Höhle, M. (1978). The Critical Period for Language Acquisition Evidence from Second Language Learning. *Child Development*, 49(4), 1114-1128.
- Tschirner, E., Nikolai, B., & Terrell, T.D. (2008). *Kontakte: A communicative approach*. New-York: McGraw-Hill.
- Ullman, M. T. (2001). A NEUROCOGNITIVE PERSPECTIVE ON LANGUAGE: THE DECLARATIVE/PROCEDURAL MODEL. *Nature Reviews Neuroscience*, 2(10), 717-726.
- Zwitserlood, P. (1994). The Role of Semantic Transparency in the Processing and Representation of Dutch Compounds. *Language And Cognitive Processes*, 9(3), 341-68.

## APPENDIX A: WRITTEN INSTRUMENTS

### Group 102. Vorsprung

1. Der Fußball
2. Der Gummi
3. Das Zentrum
4. Die Halle
5. Das Geschenk
6. Die Bahn
7. Der Flug
8. Der Hof
9. Der Hafen
10. Die Hand
11. Das Gepäck
12. Die Tasche
13. Der Beutel
14. Die Kultur
15. Der Anzug
16. Der Schuh
17. Der Stift
18. Der Lack
19. Die Lippe
20. Der Mantel
21. Der Stiefel
22. Die Hose
23. Das Portemonnaie
24. Der Ausweis
25. Das Fahrrad
26. Der Schein
27. Die Prüfung
28. Der Helm
29. Der Verkehr
30. Der Führer
31. Der Strumpf
32. Das Geld
33. Das Bild
34. Die Party

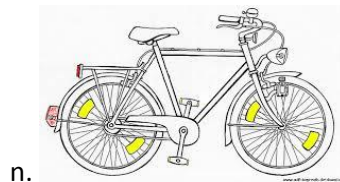
35. Das Kind
36. baden
37. kauen
38. trinken

### GER 103. Kontakte

1. Das Essen
2. Die Arbeit
3. Das Kino
4. Das Bad
5. Die Geschichte
6. Die Kunst
7. Die Prüfung
8. Das Amt
9. Das Ausland
10. Der Name
11. Der Tag
12. Die Geburt
13. Der Ort
14. Das Ende
15. Die Tasche
16. Das Rad
17. Der Schuh
18. Die Stunde
19. Der Kurs
20. Das Lied
21. Der Schein
22. Der Hof
23. Der Schrank
24. Die Uhr
25. Die Bahn
26. Der Verkäufer
27. Der Arzt
28. Die Maschine
29. Das Geschirr

30. Die Bank
31. Die Fabrik
32. Die Stadt
33. Die Heimat
34. Die Küche
35. Die Organisation
36. Die Universität
37. Das Museum
38. schwimmen
38. essen
39. wohnen
40. schlitten
41. feiern
42. spülen
43. sprechen
44. fahren

GER 102. Vorsprung. Match pictures and words. Use one picture for one word:



1. die Manteltasche, -e \_\_
2. der Lackschuh, -e \_\_
3. der Bahnverkehr \_\_
4. die Lippenstifttasche, -e \_\_
5. der Kulturbeutel, - \_\_

6. der Kaugummi, -s \_\_
7. der Fahrradhelm, -e \_\_
8. die Schuhtasche, -en \_\_
9. der Lippenstift, -e \_\_
10. die Strumpfhose, -n \_\_

GER 103. Kontakte. Match pictures and words. Use one picture for one word:





a.



b.



c.



d.



e.



f.



g.



h.



i.



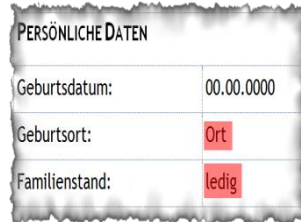
j.



k.



l.



m.



n.



o.



p.



q.

1. Die Kunstgeschichte \_\_
2. Die Geschirrspülmaschine \_\_
3. Der Hauptbahnhof \_\_
4. Die Hauptbahnhofsuhr \_\_
5. Die Sprechstunde \_\_

6. Das Fahrrad \_\_
7. Das Kunstmuseum \_\_
8. Das Kinomuseum \_\_
9. Der Geburtsort \_\_
10. Der Führerschein \_\_

11. Die Kunstgeschichteprüfung \_\_
12. Der Feiertag \_\_
13. Die Küchenuhr \_\_
14. Die Heimatstadt \_\_

GER 102. Vorsprung.TEST 1

Fill in the blanks using the words from the previous exercise. You should use ONLY 6 words out of 12.

Meine beste Freundin Erika hat sich entschieden nach Berlin zu kommen und mich zu besuchen. Sie hat einen großen Koffer mitgenommen. Erika hat alle wichtigen Sachen eingepackt. Zuerst hat sie ihre Kostümstücke eingesammelt und in den \_\_\_\_\_ (1) gelegt. Sie hatte auch eine schöne \_\_\_\_\_ (2), die ihre Oma ihr zum Geburtstag geschenkt hat. Also, hat sie alle \_\_\_\_\_ (3) dort reingetan. In ihren großen Koffer hat sie auch eine \_\_\_\_\_ (4) mit 3 Paaren \_\_\_\_\_ (5). Da es gerade in Berlin so kalt ist, hat sie auch ein Paar warme \_\_\_\_\_ (6) mitgenommen.

GER 102. Vorsprung. Delayed test

Write the articles of the following words

\_\_\_ Manteltasche

\_\_\_ Kindergeschenk

\_\_\_ Prüfungszentrum

\_\_\_ Partygeschenk

\_\_\_ Schuhtasche

\_\_\_ Hauptbahnhofsverkehr

\_\_\_ Strumpfhose

\_\_\_ Kaugummi

\_\_\_ Fahrradhelm

\_\_\_ Geburtstagsgeschenk

\_\_\_ Handschuh, \_\_\_ Handschuhe

\_\_\_ Stadtzentrum

Fill in the blanks using the words from the previous exercise. You should use ONLY 6 words out of 12.

Erika muss eine Prüfung ablegen. Sie fährt zum Stadtzentrum (1), wo ihre Universität ist. Da im \_\_\_\_\_ (2) zeigt sie ihren Personalausweis vor, nimmt Testpapiere und schreibt ihren Test. 2 Stunden spät ist sie schon fertig. „Super“, denkt Erika, „Mein Test ist ganz gut gelaufen! Ich hoffe ich bekomme eine eins!“ Plötzlich klingelt ihr Handy. „Na ja, das ist vielleicht eine SMS von Alexander“, denkt Erika. Sie checkt ihr Handy: „Hallo Erika, ich habe heute meine Geburtstagsparty. Du bist herzlich eingeladen! Liebe Grüße, Stefan.“ Erika ist in der Panik: „Oh nein, ich habe kein \_\_\_\_\_ (3) gekauft! Was soll ich Stefan schenken?“ Lora hat ihm schöne und sehr warme Handschuhe aus Wolle gekauft. Alex schenkt Stefan eine super coolen \_\_\_\_\_ (4), weil er ein großer Sportler ist. Erika steht an der Haltestelle. Sie will zum Einkaufszentrum fahren, aber der \_\_\_\_\_ (5) ist heute eine Katastrophe! Sie kommt bestimmt spät auf die Party.

#### GER 103. Kontakte. TEST 1

Fill in the blanks using the words from the previous exercise. You should use ONLY 11 words out of 15.

Michaelas Heimatstadt ist Chicago, aber jetzt lebt sie in Deutschland. Ihr neuer Wohnort ist Hamburg, dort will sie \_\_\_\_\_ (1) studieren. Vom \_\_\_\_\_ (2) will sie mit der U-Bahn fahren. Sie schaut auf die \_\_\_\_\_ (3) und sieht, dass sie sich zur \_\_\_\_\_ (4) vom Universitätsauslandsamt beeilen muss. Der Zug kommt erst in 30 Minuten, also leiht sie sich ein \_\_\_\_\_ (5) aus. Auf dem \_\_\_\_\_ (6) muss sie warten. So lange liest sie Geschichten in ihrem Buch und informiert sich über Sehenswürdigkeiten in Hamburg, wie das \_\_\_\_\_ (7) oder das \_\_\_\_\_ (8). Die Frau auf dem Universitätsauslandsamt fragt sie nach

ihrem \_\_\_\_\_ (9), ihrem \_\_\_\_\_ (10) und nach ihrem  
Wohnortsnamen zur Identifikation. Danach erklärt sie Michaela, dass sie zuerst eine  
\_\_\_\_\_ (11) machen muss, dafür soll sie noch viele  
Kunstgeschichtekursbücher lesen.

GER 103. Kontakte. Delayed test

Write the articles of the following word

~~Der~~ Feiertag

\_\_\_ Geburtstagslied

\_\_\_ Fabrikarbeit

\_\_\_ Geschirrspülmaschine

\_\_\_ Arztgeschichte

\_\_\_ Geburtstagsparty

\_\_\_ Kunstgeschichte

\_\_\_ Heimatstadt

\_\_\_ Führerschein

\_\_\_ Kinogeschichte

\_\_\_ Fahrstunde

\_\_\_ Küchenlied

\_\_\_ Schlittschuhe

\_\_\_ Universitätsende

\_\_\_ Schlittschuhlaufen

Fill in the blanks using the words from the previous exercise. You should use ONLY 11 words out of 14.

Helena hat morgen Geburtstag. Sie wird 20 Jahre alt. Das wird bestimmt ein großer

Feiertag (1) mit der Familie und besten Freunden. Ihre Mutter hat gesagt, dass sie ihr eine  
neue \_\_\_\_\_ (2) kauft, weil ihr Geschirr immer wochenlang schmutzig in der

Küche steht. Helena freut sich sehr darauf. Leider kommt ihre beste Freundin Julia nicht auf die

\_\_\_\_\_ (3). Julia ist aus ihrer \_\_\_\_\_ (4) Bonn nach New York

umgezogen. Sie studiert dort jetzt \_\_\_\_\_(5) und \_\_\_\_\_(6).

Von ihrer Familie hat Helena sich dieses Jahr Geld zum Geburtstag gewünscht. Mit dem Geld

möchte sie einen \_\_\_\_\_(7) machen, der ist in Deutschland sehr teuer. Eine

\_\_\_\_\_ (8) kostet etwa vierzig Euro. Ihre Tante mag nicht so gerne Geld

verschenken also hat Helena sich von ihr \_\_\_\_\_(9) gewünscht.

\_\_\_\_\_ (10) ist nämlich Helenas neues Hobby. In ihrer Freizeit singt sie auch

in einem Chor. Jedes Jahr zu ihrem Geburtstag singt der Chor für sie ein

\_\_\_\_\_ (12). Am liebsten hätte Helena viel öfter Geburtstag!

## APPENDIX B: LETTER OF CONSENT

**Title of Project:** The Effects of Instruction on the L2 Acquisition of German Compound Nouns

**Responsible Principal Investigator:** Dr. Kristina Riedel

**Other Investigators:** Anna Tendera, Charles Webster

**Purpose of the Study:** This study investigates L2 vocabulary learning processes. In particular, it focuses on the learning of German compound nouns, which can often be a source of confusion for learners. It investigates the following key questions: (1) Which strategy of vocabulary instruction (explicit or implicit) allows students to correctly use compound nouns in German? (2) How well do learners apply their knowledge of grammatical rules about the formation of compound nouns in novel contexts?

The experiment will be conducted in three phases: familiarization (15 mm); presentation, test, and “think-aloud” comment (15 mm); delayed test (15 mm).

We anticipate only minimal risk. You may experience boredom during the lesson or mild test anxiety when completing the written assessments. You may benefit by learning about German compound nouns and reflecting on your own language abilities.

This study is anonymous. No gender, age, or other identifying information will be collected. The results of this study will be disseminated as a conference paper and as a master’s thesis.

Please contact Dr. Kristina Riedel ([kriedel@illinois.edu](mailto:kriedel@illinois.edu), 217-333-7921) with any questions, or concerns about the research. You may also call Dr. Riedel if you feel you have been injured or harmed by this research. If you have any questions about your rights as a participant in this study or any concerns or complaints, please contact the University of Illinois Institutional Review Board at 217-333-2670 (collect calls will be accepted if you identify yourself as a research participant) or via email at [irb@illinois.edu](mailto:irb@illinois.edu).

Upon successful completion of the study, you will be given 0.5% extra credit on your final course grade.

Your participation is voluntary. You may discontinue at any time without any penalty or loss of benefits. The decision to participate, decline, or withdraw from participation will have no effect on your grades at, status at, or future relations with the University of Illinois.

I am 18 years of age or older. (If you are under the age of 18, you are not allowed to participate in this study and will be given an alternative assignment.)

I have read and understand the above consent form and voluntarily agree to participate in this study.

You will be given a copy of this consent form for your records.

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Participant Signature

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Date

## APPENDIX C: IRB APPROVAL LETTER

### UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Office of Vice Chancellor for Research

Institutional Review Board  
528 East Green Street  
Suite 203  
Champaign, IL 61820



March 10, 2014

Kristina  
Riedel  
Linguistics

RE: *The Effects of Instruction on the L2 Acquisition of German Compound Nouns*  
IRB Protocol Number: 14547

**EXPIRATION DATE: 03/09/2017**

Dear Dr. Riedel:

Thank you for submitting the completed IRB application form for your project entitled *The Effects of Instruction on the L2 Acquisition of German Compound Nouns*. Your project was assigned Institutional Review Board (IRB) Protocol Number 14547 and reviewed. It has been determined that the research activities described in this application meet the criteria for exemption at 45CFR46.101(b)(1 & 2).

This determination of exemption only applies to the research study as submitted. Please note that additional modifications to your project need to be submitted to the IRB for review and exemption determination or approval before the modifications are initiated.

We appreciate your conscientious adherence to the requirements of human subjects research. If you have any questions about the IRB process, or if you need assistance at any time, please feel free to contact me or the IRB Office, or visit our website at <http://www.irb.illinois.edu>.

Sincerely,

Rebecca Van Tine, MS  
Assistant Human Subjects Research Specialist, Institutional Review Board

c: Charles Webster Anna Tendera

telephone (217) 333-2670 • fax (217) 333-0405 • email [IRB@illinois.edu](mailto:IRB@illinois.edu)